PROJECTION APPARATUS, METHOD OF MANUFACTURING THE APPARATUS, METHOD OF EXPOSURE USING THE APPARATUS, AND METHOD OF MANUFACTURING CIRCUIT DEVICES BY USING THE APPARATUS

ABSTRACT OF THE DISCLOSURE

The quantity of ultraviolet light (IL) incident on a projection optical system (PL) is measured by means of an integrator sensor (9), and the quantity of ultraviolet pulse light (IL) that has passed through the projection optical system (PL) is measured by means of an irradiation monitor (32). The quantity of transmitted light is divided by the quantity of incident light to calculate the proportion at which the ultraviolet pulse light (IL) is attenuated in the projection optical system (PL), or an attenuation factor. The attenuation factor is determined as a function of the integrated value of the quantity of incident light. During exposure, the integrated value as quantity measured by means of the integrator sensor (9) is substituted into the function to estimate the transmissivity (attenuation factor) of the projection optical system (PL). The output of an excimer laser source (1) is controlled according to this attenuation factor to control the exposure thereby preventing lowering of exposure control precision due to illumination variations (or pulse energy variations) on the substrate caused by attenuation variations (transmissivity variations) in the projection optical system.